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TEXAS AGRICULTURAL EXPERIMENT STATION

A. B. CONNER, DIRECTOR
COLLEGE STATION, BRAZOS COUNTY, TEXAS

BULLETIN NO. 489 MARCH 1934

DIVISION OF RURAL HOME RESEARCH

THE DIET OF TEXAS SCHOOL CHILDREN

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This Bulletin presents a comparison of the seasonal, regional, and racial aspects of the diet of Texas school children.

The outstanding feature in the comparisons of diets is the striking similarity between the diets in the different seasons, regions, and races. Records from either season in any region give equally satisfactory information as to the kinds of foods which the children ate.

Racial differences in the kinds of foods used were less marked than is commonly supposed. While in general, the white children had a better diet than the Mexican, and the Mexican than the negro, all appear to have had a deficiency in the use of milk, fruits, vegetables, and whole cereals. There seemed a sufficiency of protein-rich foods and a relative over-abundance of refined cereal foods. The most noteworthy racial difference is in the use of coffee and tea, three times as many of the Mexicans drinking these beverages as did the white or negro children. Coffee and tea tended to crowd milk out of the diet.

Girls had slightly better diets than boys due to more liberal use of milk, butter, fruits, and vegetables. Among white children those of 8 and 9 years, boys of 14, and girls of 13 had better diets than those of other ages. The diets of negroes, however, were progressively better as the children advanced in age.

Children of the farmer, business, and labor groups had a definitely lower consumption of milk, fruits, vegetables, whole cereals, and coffee and tea than the professional group had.

This study indicates that one or more other factors than season of the year, the supply of locally-produced foods, or racial food habits have a greater influence in determining what kinds of foods school children eat. The findings suggest that there are good reasons for continued emphasis upon the liberal use of milk, fruits, vegetables, and whole cereals in the diet of growing children.

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BULLETIN NO. 489 MARCH 1934

THE DIET OF TEXAS SCHOOL CHILDREN*

JESSIE WHITACRE

Despite the large number of studies in human nutrition that have been made in the last half century in the United States, relatively little attention has been given to the diets of individual children of school age. The influence of race, of seasons, and of regional differences in climate and in industry has been even less considered. The important problems of the relation of human diet to various aspects of health deserve extensive investigation. A vast amount of data is yet needed to fill in the gaps in our information concerning human nutrition. These considerations suggested that a study of the diet of Texas school children be undertaken.

This Bulletin reports the results of an inquiry into the dietary habits of individual children of school age from three race groups†—Mexican, white, and negro—in three widely differing agricultural regions of Texas. The relationship between diet and two indices of well-being, condition of teeth and weight-height-age status, has been included in this study, and will be reported upon in subsequent publications.

METHOD OF PROCEDURE

Regions Studied

Three counties, Brazos, Hidalgo, and Jefferson, each representative of one of the distinct regions of the State, were chosen for this survey. The 1930 census is the source of information for the descriptions given of these counties.

Brazos county, in the post oak strip of East Texas, is distinctly an agricultural section, with 70 per cent of its total land area in its 2,493 farms. The one city is the county seat, Bryan, with a population of 7,814. The next most populous center is College Station, the site of the Agricultural and Mechanical College, with residents numbering about 1000 exclusive of the student body. College Station is almost entirely a residental community depending largely upon Bryan, five miles distant, for the service of business concerns. The population of the county (21,835) is fairly evenly divided between whites and negroes. Among the whites about 6 per cent are of foreign birth or extraction, Italians and Bohemians being most numerous.

Diversified farming is practiced in Brazos county, but cotton is by far the leading crop; corn, hay, and sorghum for hay and grain are important. Four-fifths of the farms are reported as growing farm and garden vegetables, among which sweet and Irish potatoes are at the head of the list. Other common vegetables include many varieties of beans and

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†The children included in this study, all citizens of the United States, have been classified into three groups, Mexicans, other whites, and negroes. As a matter of convenience, these groups are referred to as race groups, and for the sake of brevity in this bulletin the designation "white" is used for the second of these groups.

field peas, tomatoes, okra, squash, cabbage, onions, turnips, mustard greens, and collards. The most common fruits grown are blackberries, dewberries, grapes, and figs, while peaches and pears are of less importance. Pecans are grown on some farms. Dairying, poultry raising, and egg production afford products for both home consumption and sale.

Hidalgo county, representative of "the valley," the region bordering upon the Rio Grande, has 55 per cent of its land area in a total of 4,321 farms. The largest population center in the county is McAllen with 9,074 inhabitants; Edinburg, the county seat, is next in size with a population of 4,821. Both towns have large consolidated school systems. The total population numbers 77,004, of which 44 per cent are white, 54 per cent Mexican, and the remainder negroes. Less than 4 per cent of the white population is foreign born, chiefly Scandinavians and Germans.

The extensive growing of citrus fruit and of truck crops is the distinguishing feature of the agriculture in this county. Only 6 per cent of the farms reported growing vegetables for home use only. There were produced in 1929 over one half million boxes of grapefruit, nearly one quarter million boxes of oranges and lemons, and vegetables whose total value was nearly one and one half million dollars. Four vegetables, cabbage, tomatoes, carrots, and corn, had a total worth of over $1,000,000 in 1929. Beets, snap beans, onions, spinach, and potatoes are also important among vegetables, and strawberries and watermelons among fruits. Growing of cotton, dairying, and poultry raising follow in importance citrus and vegetable growing in the agriculture of the county.

Jefferson county representing the gulf coast region has but 43 per cent of its land area in farms, which number 1,012. Eighty per cent of the people in the county live in the two largest cities, Beaumont and Port Arthur with populations of 57,732 and 50,902, respectively; only 10 per cent of the population is classified as rural. Of the total population (133,391), the white race constitutes 70 per cent, the negro 25 per cent, and the Mexican 5 per cent. Less than 3 per cent of the white inhabitants are foreign-born, these being chiefly Italians and Bohemians.

The outstanding crops of the county are figs and rice; a million and a quarter pounds of figs and a million and a quarter bushels of rice were produced in 1929. Watermelons, cantaloupes, strawberries, and grapes are, after figs, the most common fruits grown. Among the vegetables grown should be mentioned sweet potatoes, Irish potatoes, tomatoes, snap beans, cucumbers, cabbage, and green peas. Six per cent of the farms of this county reported growing vegetables for home use only. In proportion to the total farming area, dairying is more important in Jefferson county than in either Hidalgo or Brazos counties; nearly two and one-fourth million gallons of milk were produced in Jefferson county in 1929. Poultry raising and egg production, while less extensively practised than in the other two counties, still serve for both home consumption and sale.

Time and Method of Securing Data

The data for this study were collected within the months of February, March, April, May, October, and November of 1927; January, February, March, April, and November of 1928; and April of 1929. Records of late March, April, and May are called "spring"; those of October and early November "fall"; of late November, December, January, and February, "winter". Fall records were secured only in Hidalgo county. For convenience the fall and winter records are termed "winter" in this report.

Contact with the pupils who were subjects in this study was made through the cooperation of representative public schools in each county. In Brazos and Jefferson counties, both city and rural schools were chosen, and in Hidalgo county the schools of McAllen and Edinburg. After the superintendent and principal in each school system had agreed to participation by their pupils, each classroom was visited and the nature of the undertaking explained.

Forms were provided for recording daily for eight consecutive days in each of two different seasons all foods eaten at meals and between meals. Pupils in the third grade and above kept their own records, using school time for all except week-end records, which were filled out at home. Records of the white children in the first and second grades were kept by the parents, those of the Mexicans and negroes in the first and second grades, by the observers. The utmost care was exercised to divorce all teaching from the process of securing the records. Neither praise nor blame was given by word, by tone of voice, or by expression of face, for a child's having any particular food on his record. The conditions under which the diet records were secured are believed to have minimized the errors that are bound to be in this type of data. Evidence of a fairly high degree of reliability in such records has been secured in connection with another study (15). An observer recorded on three consecutive days the noon meal of each of 149 children as they were eating; in the afternoon school period each child also recorded his own lunch. In 93 per cent of the cases the children's records were satisfactory; in 58 per cent of the cases the records of observer and child were identical; in 35 per cent they differed within five points in their score.

Each child was asked to record the date of his birth, from which was calculated his age. The child also reported the occupation of his parents or guardian.

Group from Whom Data Were Secured

Altogether there were 4,258 white children, 1,350 negroes, and 482 Mexicans who participated in this study. Of these numbers, about one third in each race kept diet records for two seasons. This latter group of 1,617 children in the counties as shown in Table 1, is used for the present report.

It was decided that these numbers were a satisfactory sample since an analysis of the data for Brazos county children showed no different results with either the whites or negroes between the group that kept records both seasons and the larger group in which those who kept a record for only one season were also included. The age limits of the children are 5 to 21 years, with 85 per cent and 87 per cent of the white and Mexican groups, respectively, between 8 years and 15 years of age, and 86 per cent of the negro between 8 and 16 years. An age range of 8 to 17 years includes 95 per cent of the white group, 92 per cent of the negro, and 98 per cent of the Mexican.

Table 1. Number of children who kept diet records two seasons

Race	County	Number of children		
		Boys	Girls	Total
White	Brazo	241	291	532
	Hidalgo	100	122	222
	Jefferson	112	127	239
Total				993
Negro	Brazos	86	110	196
	Jefferson	109	166	275
Total				471
Mexican	Hidalgo	76	77	153
Grand total				1617

TYPICAL DIET RECORDS

Six typical records, one of the poorer and one of the better diets in each race are shown in Tables 2, 3, 4, 5, 6, and 7. Both sexes, the two seasons, and different ages are represented in these records.

The relatively few records which seemed unreasonable, or bore evidence of not having been faithfully kept were discarded. The most common fault observed in the records was the failure to state the "kind" of certain food preparations as pie, sandwich, soup, salad, or dessert. Occasionally a child failed to state definitely whether or not milk was eaten on cereals. Absence of butter from some records raised the question as to whether the child did not eat it or merely neglected to record it. In recording the diets for the younger children it was learned that butter was often really lacking in the diet.

As was to be expected, not all records covered the entire 8-day period, but approximately half of those for each race were for the full time. Records of 6, 7, and 8 days together included 80 per cent, 85 per cent, and 87 per cent, respectively, of the Mexican, white, and negro groups. Comparison of the score on the first 4 days with that on the entire 7 or 8 days in 165 records found the plus and minus differences fairly equally divided, and the coefficient of correlation between the scores on the 4-day and the 7- or 8-day period was 0.8. Records of 4 and 5 days, therefore, were also used and constitute 15 to 20 per cent of the entire number.

1928	Breakfast		Dinner		Supper		Between meals	
	Food	Amount	Food	Amount	Food	Amount	Food	Amount
April 19	Post bran Banana Milk Peach conserve Biscuit, butter	1 bowl 1 1 glass 1 serving 2	Cream beef Luncheon salad Cornbread Milk Graham crackers	2 servings 1 serving 1 slice 1 glass 5	Meat en casserole Cornbread Milk Carrots Tapioca pudding	1 serving 1 slice 2 glasses 1 serving 1 serving	No record	
20	Shredded wheat, sugar, cream, banana Peach conserve Biscuit Milk	1 biscuit 2 servings 3 1 glass	Luncheon salad Potato cake Peas Carrots Milk Cornbread	1 serving 1 1 serving 1 serving 1 glass 1 slice	Luncheon salad Cream potatoes Peas Carrots Light bread Milk	1 serving 1 serving 1 serving 1 serving 1 slice 2 glasses	Orange Candy	1 2
21	Shredded wheat, sugar, cream Biscuit Peach conserve Milk	1 1 1 serving 1 glass	Macaroni Turnip greens Fried Irish potato Biscuit Peach conserve Milk	2 servings 2 servings 2 servings 1 1 serving 1 glass	Pork chops Light bread Milk Biscuit pudding	1 slice 1 slice 1 glass 1 serving	Orange	1
22	Puffed rice, sugar, cream banana Toast Milk	1 bowl 2 pieces 1 glass	Fruit salad Roast Meat gravy Potato roasted with string beans Bun Milk Pineapple pudding	1 serving 1 slice 1 serving 1 1 1 glass 1 serving	Meat Light bread Fruit salad Sweet milk Bulgarian buttermilk	1 slice 2 slices 1 serving 2 glasses 1 glass	Candy Orange	2 1
23	Puffed rice, sugar, cream and banana Biscuit Milk	1 bowl 2 1 glass	Spinach Cornbread Peach conserve Milk Light bread	2 servings 2 slices 2 servings 2 glasses 2 slices	Canned corn Fresh tomatoes Light bread Luncheon meat Bulgarian buttermilk	1 serving 4 slices 2 slices 1 slice 1 glass	Orange	1
24	Bran, sugar, cream, banana Biscuit, butter Peach conserve Milk	1 bowl 2 2 servings 1 glass	Buns, butter Strawberry shortcake, cream Fruit conserve Buttermilk (Bulgarian)	3 1 slice 2 servings 1 glass	Peach conserve Light bread Milk	1 serving 1 slice 1 glass	Graham crackers	10
25	Bran, sugar, cream Fruit conserve Biscuit Milk	1 bowl 1 serving 3 1 glass	Nothing		Light bread Fruit conserve Milk Tapioca pudding Sponge cake	1 slice 1 serving 1 glass 1 serving 1 slice	No record	
26	Shredded wheat, milk, sugar Conserve Milk Biscuit, butter	1 bowl 2 servings 1 glass 2	Egg sandwich, lettuce Dried ham sandwich Graham crackers Orange	1 1 6 1	Steak Cream potatoes Light bread Milk Tapioca pudding	1 slice 2 servings 2 slices 1 glass 1 serving	Candy Coca cola	1 piece 1 bottle

Table 3. Diet record of 11-year-old white girl; { ***score of this winter record, 51*** / ***corresponding spring record, 68***

Date 1928	Breakfast		Dinner		Supper		Between meals	
	Food	Amount	Food	Amount	Food	Amount	Food	Amount
February 16	Milk	1 glass	Egg Irish potatoes Milk	1 1 serving 1 glass	Potted ham sandwich Cocoa Marshmallows Prunes	1 1½ cup 3 4 or 5	Cakes Tidbits	4 1 serving
17	Milk Bread	1 glass 2 slices	Bread, butter sandwich Potato salad, lettuce leaf Meat loaf Cocoa, marshmallow Ice cream	1 1 serving 1 slice 1 cup 1 1 cube	Irish potatoes Grits Meat	1 serving 1 serving 1 piece	—	
18	Cocoa Bread	1 glass 2 slices	Sausage Rice Gravy	1 serving 1 serving 1 serving	Eggs Bread	2 2	Marshmallow Candy Prunes	7 3 pieces 2 servings
19	Milk Bread Prune syrup Prune	1 glass 2 slices 1 serving 1	Roast Rice Banana salad Mash potatoes Cake and sauce	2 pieces 1 serving — 1 serving 1 serving	Nothing		Cake Sauce	2 pieces 1 serving
20	Milk Bread	1 glass 2 slices	Bread Meat Lettuce Milk	2 slices 2 pieces 1 leaf 1 glass	Potatoes Meat Grits	2 servings 2 servings 2 servings	Nothing	
21	Milk Bread	1 glass 3 slices	Milk Bread, peanut butter	1 glass 1 slice	Lima beans Rice	2 servings 2 servings	Nothing	
22	Milk	1 glass	Egg sandwich Ice cream	1 1 serving	Rice Lima beans Meat	2 servings 2 servings 2 servings	Cake Candy	1 1 piece
23	Milk Bread	1 glass 2 slices	Peanut butter Bread Milk	1 serving 1 slice 1 glass	Lima beans Rice Fat meat	2 servings 2 servings 2 servings	—	

Date 1928	Breakfast		Dinner		Supper		Between meals	
	Food	Amount	Food	Amount	Food	Amount	Food	Amount
November 20	Ralston, milk, sugar Sweet milk Toast, butter	1 bowl 1 glass 1 slice	Celery soup Light bread Cheese sandwich	1 serving 2 slices 1	Boiled chicken Buttermilk String beans Cornbread	3 pieces 2 glasses 1 serving 1 slice	Candy Cakes Apple	1 piece 1 box 1
21	Ralston, sugar, milk Butter, toast Sweet milk Grapefruit	1 serving 1 slice 1 glass ½ piece	Meat sandwich Mayonnaise Ham sandwich Pork Cake	1 piece 1 piece 1 piece 1 slice	Chicken, celery Buttermilk Fruit salad Chili	1 serving 1 glass 1 serving 1 serving	Apple Candy Sucker	1 1 piece 1
22	Ralston, sugar, milk Butter, toast Sweet milk Grapefruit	1 bowl 2 pieces 1 glass 1	Chili meat sandwich Pork ribs Peanut sandwich	2 1 1	Pork backbone String beans Cornbread Buttermilk	2 servings 1 serving 2 pieces 1 glass	Candy Orange Pecans	3 pieces 1 12
23	Ralston, milk, sugar Butter, toast Sweet milk Orange	1 bowl 1 1 glass ½ cup	Peanut sandwich Orange Chicken sandwich Nut bread	2 1 2 1 slice	Canned peaches Chicken, celery Light bread Peas Buttermilk	3 — 1 slice 1 serving 1 glass	Candy	1 sucker
24	Ralston, milk, sugar Whole wheat bread Sweet milk Grapefruit and sugar	1 serving 2 slices 1 glass 1	Collard greens Baked Potatoes Cornbread	3 servings 3 2 slices	Nothing		Nothing	
25	Ralston, milk, sugar Sweet milk Toast, butter Orange	1 serving 1 glass 1 piece 1	Cabbage Cornbread Pork roast Cake	1 serving 1 piece 1 piece 1 piece	Nothing		Nothing	
26	Ralston, milk, sugar Toast, butter Sweet milk Orange Grapefruit	1 serving 1 slice 1 glass 1 ½	Pork sandwich Fig sandwich Beef sandwich Lettuce, cheese	1 1 1 1 serving	String beans Macaroni, cheese Light bread Buttermilk Pork Beef	1 serving 1 serving 1 piece 1 glass 1 piece 1 slice	Nothing	
27	Ralston, milk, sugar Toast, butter Orange Sweet milk	1 bowl 2 pieces 1 1 glass	Fig sandwich Beef sandwich Lettuce, peanut butter	1 1 1	Pork, beans Vegetable soup Buttermilk Peaches, whipped cream	1 serving 1 serving 1 glass 1 serving	Pecans Sucker	6 1

Table 5. Diet record of 14-year-old negro boy; { score of this spring record, 40 / corresponding winter record, 47

Date 1929	Breakfast		Dinner		Supper		Between meals	
	Food	Amount	Food	Amount	Food	Amount	Food	Amount
April 16	Toast, butter Oatmeal Milk	2 pieces 1 bowl 1 glass	Cornbread Cabbage and rice Sausage Lemonade	2 pieces 1 serving — —	Biscuit Pork steak Tea, sugar	3 1 piece 1 glass	Pork Steak Biscuit	1 piece 1
17	Toast, butter Milk Tea, sugar	2 slices 1 glass —	Biscuit Sweet potatoes Pork chops	3 5 slices 1 piece	Biscuit Sausage Rice	3 2 pieces 1 serving	Biscuit Pork chops	1 1
18	Tea, sugar Light bread Syrup	1 cup 2 slices 1 serving	Butter beans Rice Cornbread	2 servings 2 servings 2 pieces	Baked sweet potatoes Sausage Biscuit	2 2 pieces 3	Baked sweet potatoes Sausage Biscuit	1 1 piece 1
19	Tea, sugar Toast, butter Syrup	1 cup 2 slices 1 serving	Cornbread Cabbage and rice Sweet potatoes	2 pieces 1 serving —	Biscuit Steak Rice Canned corn	3 2 pieces 1 serving —	Biscuit Steak Rice	1 1 piece —
20	Apple Toast, butter	1 2 pieces	Rice Biscuit, syrup	— —	Pork chops Rice Cornbread	1 piece 1 serving 2 pieces	Nothing	
21	Toast, butter Syrup	3 1 serving	Sweet potatoes Cornbread Rice Liver	1 serving — 1 serving 2 pieces	Stewed meat Gravy, rice Cornbread	2 servings 2 servings 2 pieces	—	
22	Toast, butter Tea Syrup Apple	3 slices 1 cup 1 serving 1	Butter beans Rice Biscuit Liver	2 servings 2 servings 3 1 piece	Biscuit Chili Rice Corn	4 1 bowl 1 serving 1 serving	Nothing	
23	Toast, butter Tea, sugar Syrup	3 slices 1 cup 1 serving	Back bones Biscuit Rice and gravy	1 piece 2 2 servings	Liver Rice Biscuit	2 pieces 1 serving 3	Back bones Biscuit	1 piece 1

Table 6. Diet record of 13-year-old Mexican girl; { score of this spring record, 70 / corresponding fall record, 71

Date 1927	Breakfast		Dinner		Supper		Between meals	
	Food	Amount	Food	Amount	Food	Amount	Food	Amount
March 18	Milk Eggs Tortillas	1 cup 2 2	Beans Bread, butter Fish Tortillas	1 serving — 1 piece 4	Rice Coffee Butter	1 serving 1 cup 1 piece	Apple Candy	10cts. 5cts.
19	Eggs Tortillas Milk	2 3 1 glass	Meat Tortillas Coffee	1 serving 4 1 cup	Tamales Milk	3 1 cup	Candy Orange	2 1
20	Potatoes Milk Tortillas	1 1 glass 3	Fish Tortillas Coffee	1 serving 4 1 cup	Oysters Tortillas Milk	3 2 1 cup	Ice cream Bananas Apples	1 cone 2 1
21	Toast Milk Coffee	3 pieces 1 glass 1 cup	Rice Tortillas Coffee Beans	1 serving 4 1 cup 1 serving	Salmon Tortillas Eggs Milk	1 serving 4 2 1 glass	Nothing	
22	Eggs Tortillas Milk Toast Coffee	2 3 1 glass 5 pieces 1 cup	Potatoes Milk Tortillas	1 serving 1 cup 4	Meat Tortillas Rice soup Coffee and milk	1 serving 3 1 serving 1 cup	Nothing	
23	Eggs Tortillas Coffee	2 2 1 cup	Rice soup Bread Fish Tortillas	1 serving 4 pieces 2 pieces 2	English peas Tortillas Milk Beans	1 serving 3 1 cup 1 serving	Nothing	
24	Bread Beans Tortillas Milk	5 pieces 1 serving 2 1 cup	Beans Beef Butter Tortillas Coffee	1 serving 1 serving 2 pieces 3 1 cup	Potatoes Beans Milk Tortillas	1 serving 1 serving 1 cup 4	Nothing	
25	Eggs Tortillas Milk	2 3 1 cup	English peas Bread, raisins Beans Tortillas Coffee	1 serving 1 serving 1 serving 4 1 cup	Peas Coffee Tortillas	1 serving 1 cup 4	Orange Candy Figs	1 4 2

Table 7. Diet record of 14-year-old Mexican boy; { score of this fall record, 44 / corresponding spring record, 48

Date 1927	Breakfast		Dinner		Supper		Between meals	
	Food	Amount	Food	Amount	Food	Amount	Food	Amount
October 26	Bacon, eggs Coffee, milk Tortillas	1 serving 1 cup 4	Meat Coffee Light bread Molasses	1 piece ½ cup 3 slices ½ serving	Meat Egg Coffee, milk Tortillas	1 piece 1 1 cup 3	Nothing	
27	Egg Coffee, milk Tortillas	1 1 cup 3	Hog meat Light bread Molasses	1 piece 3 slices ½ serving	Egg Coffee, milk Tortillas	1 1 cup 3	Candy Grapefruit	6cts. ½
28	Butter Tortillas Coffee, milk	little 3 1 cup	Sweet corn Light bread Coffee	1 serving 3 slices ½ cup	Butter Sweet bread Coffee, milk	little 3 slices 1 cup	Sweet bread Apple	5cts. ½
29	Egg Barbecue Tortillas Coffee, milk	1 1 piece 3 1 cup	Meat Light bread Coffee	1 piece 3 slices ½ cup	Egg Coffee, milk Tortillas	1 1 cup 3	Grapes	5cts.
30	Coffee, milk Tortillas	1 cup 3	Meat Potatoes Bread Coffee	1 serving 1 3 slices ½ cup	Coffee, milk Tortillas	1 cup 3	Candy	5cts.
31	Egg Coffee, milk Tortillas	1 1 cup 3	Meat Rice Coffee Light bread	1 piece 1 serving ½ cup 3 slices	Meat Coffee, milk Tortillas	1 piece 1 cup 3	Sweetbread	5cts.
November 1	Eggs Tortillas Coffee	1 3 1 cup	Meat Pumpkin Coffee Light bread	1 piece 1 serving ½ cup 3 slices	Sweet bread Butter Coffee, milk	5cts 1 square 1 cup	Sweet bread	5cts.
2	Butter Tortillas Coffee, milk	1 square 3 1 cup	Meat Light bread Coffee Butter	1 serving 3 slices ½ cup 1 square	Butter Sweet bread Coffee, milk	1 square 5cts 1 cup	Candy Sweetbread	5cts. 5cts.

DIET WITH REFERENCE TO SEASON AND REGION

Kinds of Foods and the Number of Times They Were Mentioned in the Diets of the Two Seasons

A complete list of the kinds of foods (other than milk, butter, and foods made of refined cereals) is given in Table 8. Here the total frequency of each food and the frequency as percentage of the total days in the entire number of records of each region and each season are also shown. Although more than 60 different foods were recorded in the diets of the Mexican and of the negro children, and over 80 in those of the white children, a surprisingly small number of these foods appeared with frequent regularity. Only 16 foods were eaten by Mexican children on the average as often as once in 10 days, 18 by negro children, and 22 by the white. These foods are listed in Table 9 as the foods most frequently eaten. As may be seen in Table 9, only meat, milk, and cereals (including breads, biscuits, hot cakes, pie, cookies, breakfast cereals, grits, rice, etc.) were eaten once or more per day by each race in the different regions. Foods eaten less frequently than once a day but not more than twice a week, included butter, Irish potatoes, and eggs for white children; and coffee, beans, and eggs for the Mexicans. The most common foods of refined cereals were white bread, biscuit, corn bread, rice, and grits.

A graphic distribution of the average number of times the several classes of foods were eaten daily is shown in Figure 1. The spring records were used. The most conspicious feature of the graphs is the preponderance of children of all races who had 2 to 3 daily servings of all protein, from 3 to 5 servings of all cereals, and from none to one half serving per day of whole cereals. The relative infrequency of butter, fruits, and vegetables, and the moderate use of milk is emphasized by these graphs.

Regional differences in the use of individual foods are few and of indifference with respect to the nutritive value of the diet. For example, Hidalgo county white children used oranges and grapefruit in fairly equal amounts, while in all other groups oranges were relatively more abundant. Brazos county children ate more blackberries and dewberries than strawberries, while in Hidalgo county the reverse relationship held. Figs, though a distinguishing crop of Jefferson county, were no more prominent in the diets there than in Brazos county; in neither case are they an important item in the diet. Cabbage and kraut were slightly more abundant in the diets of Hidalgo county white children and lettuce in the spring diets of Brazos county than in other groups; all leafy vegetables together were used to about the same extent in Hidalgo and Jefferson counties with Brazos county but slightly ahead of them. Tomatoes are one of the four chief "other vegetables" in all three counties, but are even more prominent in Jefferson county diets than in Hidalgo although they are one of the leading crops in Hidalgo county.

Table 8. Kinds of fruits, vegetables, whole cereals, protein foods (not milk), sweet foods, and beverages in the spring and winter diets of each race in the three counties

Food	White Children											
	Brazos County				Jefferson County				Hidalgo County			
	Number of times mentioned				Number of times mentioned				Number of times mentioned			
	In spring records		In winter records		In spring records		In winter records		In spring records		In winter records	
	Total in 3791 days	Times per 100 days[1]	Total in 3798 days	Times per 100 days[1]	Total in 1690 days	Times per 100 days[1]	Total in 1702 days	Times per 100 days[1]	Total in 1370 days	Times per 100 days[1]	Total in 1405 days	Times per 100 days[1]
Fruit												
Citrus												
Orange	659	17.4	731	19.2	266	15.7	231	13.6	248	18.1	221	15.7
Lemon	132	3.5	135	3.6	75	4.4	41	2.4	36	2.6	55	3.9
Grapefruit	85	2.2	313	8.3	26	1.5	53	3.1	201	14.7	311	22.1
Lime	1		1		2		—		—		6	
Tangerine	—		—		—		4		—		27	1.9
Raw (not citrus)												
Apple	994	26.2	1386	36.5	488	28.9	495	29.1	337	24.6	412	29.3
Banana	345	9.1	401	10.6	295	17.5	330	19.4	189	13.8	174	12.4
Blackberries and dewberries	399	10.5	2		33	2.0	14		1		—	
Strawberries	156	4.1	3		55	3.3	94	5.5	125	9.1	1	
Grapes	23		23		4		1		3		78	5.6
Peaches	2		37		3		1		1		58	4.1
Pears	4		2		—		—		—		6	
Figs	3		2		15		12		—		2	
Plums	1		1		10		1		—		—	
Cantaloupe	—		—		8		—		—		1	
Mulberries	—		—		—		9		3		—	
Pomegranate	—		—		—		—		—		1	
Cooked or dried												
Jam, jelly, and preserves	910	24.0	669	17.6	317	18.8	271	15.9	194	14.2	182	13.0
Peaches	223	5.9	226	6.0	84	5.0	88	5.2	86	6.3	21	1.5
Blackberries and dewberries	294	7.8	60	1.6	41	2.4	27	1.6	16	1.2	16	1.1
Raisins	163	4.3	163	4.3	81	4.8	72	4.2	50	3.6	51	3.6
Apples	158	4.2	144	3.8	78	4.6	81	4.8	60	4.4	118	8.4
Prunes	103	2.7	126	3.3	76	4.5	64	3.8	31	2.3	20	1.4
Pineapple	72	1.9	65	1.7	38	2.2	47	2.8	26	1.9	36	2.6
Figs	68	1.8	47	1.2	17	1.0	34	2.0	2		16	1.1
Coconut	51	1.3	77	2.0	17	1.0	25	1.5	5		33	2.3
Apricots	28		52	1.4	5		8		13		15	1.1
Pears	50	1.3	40	1.1	15		14		18	1.3	5	

Table 8. Kinds of fruits, vegetables, whole cereals, protein foods (not milk), sweet foods, and beverages in the spring and winter diets of each race in the three counties—Continued

Food	White Children											
	Brazos County				Jefferson County				Hidalgo County			
	Number of times mentioned				Number of times mentioned				Number of times mentioned			
	In spring records		In winter records		In spring records		In winter records		In spring records		In winter records	
	Total in 3791 days	Times per 100 days[1]	Total in 3798 days	Times per 100 days[1]	Total in 1690 days	Times per 100 days[1]	Total in 1702 days	Times per 100 days[1]	Total in 1370 days	Times per 100 days[1]	Total in 1405 days	Times per 100 days[1]
Grapejuice and punch	23		28		15		14		4		3	
Cherries	16		14		4		8		11		30	2.1
Fruit cake	5		22		1		3		4		4	
Plums	11		12		3		—		2		10	
Dates	—		12		1		6		4		5	
Strawberries	1		2		10		12		5		9	
Cranberries	—		3		2		2		9		33	2.3
Raspberries	1		1		—		—		1		—	
Banana	—		—		—		1		—		—	
Vegetables												
Leafy												
Lettuce	844	22.6	437	11.5	153	9.1	243	14.3	197	14.4	220	15.7
Cabbage and kraut	340	9.0	367	9.7	103	6.1	122	7.2	196	14.3	40	2.8
Spinach Turnip greens Mustard greens Swiss chard Collards Beet greens Kale Rape Greens (kind not stated)	284	7.5	145	3.8	144	6.7	120	7.1	35	2.6	50	3.6
Celery	18		38	1.0	17	1.0	18	1.1	16	1.2	24	1.7
Asparagus	20		23		8		2		3		1	
Artichoke	1		1		—		1		—		—	
Potato or substitute												
Irish potato	1633	43.1	1681	44.3	827	48.9	814	47.8	1018	74.3	883	62.8
Sweet potato	89	2.3	519	13.7	122	7.2	110	6.5	78	5.7	101	7.2
Sweet corn	160	4.2	163	4.3	102	6.0	61	3.6	62	3.5	95	6.8
Others												
Dry beans	654	17.3	828	21.8	495	29.3	587	34.5	390	28.5	310	22.1

Table 8. Kinds of fruits, vegetables, whole cereals, protein foods (not milk), sweet foods, and beverages in the spring and winter diets of each race in the three counties—Continued

Food	White Children											
	Brazos County				Jefferson County				Hidalgo County			
	Number of times mentioned				Number of times mentioned				Number of times mentioned			
	In spring records		In winter records		In spring records		In winter records		In spring records		In winter records	
	Total in 3791 days	Times per 100 days[1]	Total in 3798 days	Times per 100 days[1]	Total in 1690 days	Times per 100 days[1]	Total in 1702 days	Times per 100 days[1]	Total in 1370 days	Times per 100 days[1]	Total in 1405 days	Times per 100 days[1]
Peas, black-eyed and other field English peas	515	13.6	295	7.8	206	12.2	195	11.5	100	7.3	119	8.5
Tomatoes	426	11.2	342	9.0	360	21.3	173	10.2	147	10.7	235	16.7
Onions	334	8.8	136	3.6	63	3.7	109	6.4	51	3.7	72	5.1
Relish and pickle	300	7.9	331	8.7	85	5.0	95	5.6	41	3.0	58	4.1
String beans	143	3.8	45	1.2	176	10.4	49	2.9	35	2.6	83	5.9
Beets	72	1.9	47	1.2	42	2.5	18	1.1	56	4.1	10	
Carrots	79	2.1	55	1.4	38	2.2	20	1.2	50	3.6	20	1.4
Vegetable soup	62	1.6	123	3.2	40	2.4	61	3.6	38	2.8	48	3.4
Turnips	31		69	1.8	27	1.6	16		15	1.1	27	1.9
Radishes	133	3.5	8		20	1.2	35	2.1	1		25	1.8
Olives	32		29		4		12		8		8	
Peppers and pimentoes	17		22		7		6		1		26	1.9
Squash	16		—		19	1.1	2		—		3	
Cauliflower	4		14		2		6		4		—	
Okra	4		1		26	1.5	4		2		18	1.3
Cucumber	14		2		20	1.1	1		1		1	
Pumpkin	1		10		1		3		5		17	1.2
Eggplant	—		—		5		1		—		24	1.7
Whole cereal group												
Oats, rolled	897	23.7	1044	27.5	346	20.5	384	23.1	346	25.3	297	21.1
Bran	186	4.9	140	3.7	72	4.3	70	4.1	75	5.5	45	3.2
Shredded wheat	132	3.5	116	3.1	28	1.7	24	1.4	34	2.5	41	2.9
Whole wheat (bread and crackers)	111	2.9	155	4.1	77	4.6	65	3.8	44	3.2	52	3.7
Grapenuts	66	1.7	74	1.9	23	1.4	20	1.2	30	2.2	41	2.9
Puffed wheat	23		41	1.1	15		16		26	1.9	19	1.4
Pep	36		57	1.5	3		6		22	1.6	14	
Ralston	11		15		—		4		1		1	
Popcorn	21		37		19	1.1	26	1.5	19	1.4	9	

Table 8. Kinds of fruits, vegetables, whole cereals, protein foods (not milk), sweet foods, and beverages in the spring and winter diets of each race in the three counties—Continued

Food	White Children											
	Brazos County				Jefferson County				Hidalgo County			
	Number of times mentioned				Number of times mentioned				Number of times mentioned			
	In spring records		In winter records		In spring records		In winter records		In spring records		In winter records	
	Total in 3791 days	Times per 100 days[1]	Total in 3798 days	Times per 100 days[1]	Total in 1690 days	Times per 100 days[1]	Total in 1702 days	Times per 100 days[1]	Total in 1370 days	Times per 100 days[1]	Total in 1405 days	Times per 100 days[1]
Tamales, enchiladas, and tortillas	10		15		8		10		4		6	
Muffets	1		15		1		—		—		6	
Wheatena	2		—		—		7		11		5	
Krumbles	—		—		—		—		2		—	
Protein foods (not milk)												
Meat	3966	104.6	4866	128.1	1952	115.5	2153	126.5	1491	108.8	1602	114.0
Eggs	2530	66.7	1452	38.2	1050	62.1	880	51.7	882	64.4	455	32.4
Legumes	1138	30.0	1074	28.2	688	40.7	707	41.5	398	29.1	410	29.2
Nuts	220	22.4	359	9.5	130	7.7	137	8.0	96	7.0	125	8.9
Cheese	194	3.4	241	6.3	128	7.6	155	9.1	147	10.7	119	8.5
Other foods												
Pastry	3147	83.0	2843	74.9	1065	63.0	1071	62.9	959	70.0	746	53.1
Candy	797	21.0	981	25.8	412	24.4	515	30.1	545	39.8	259	18.4
Molasses and syrup	651	17.2	894	23.5	351	20.8	269	15.8	149	10.9	168	12.0
Cocoa	429	11.3	588	15.5	345	20.4	399	23.4	263	19.2	229	16.3
Coffee	516	13.6	446	11.7	225	13.3	226	13.3	240	17.5	211	15.0
Tea	126	3.3	67	1.8	132	7.8	75	4.4	69	5.0	143	10.2
Cocoa cola, etc	82	2.2	52	1.4	52	3.1	104	6.1	68	5.0	98	7.0

Table 8. Kinds of fruits, vegetables, whole cereals, protein foods (not milk), sweet foods, and beverages in the spring and winter diets of each race in the three counties—Continued

Food	Negro Children								Mexican Children			
	Brazos County				Jefferson County				Hidalgo County			
	Number of times mentioned				Number of times mentioned				Number of times mentioned			
	In spring records		In winter records		In spring records		In winter records		In spring records		In winter records	
	Total in 1439 days	Times per 100 days[1]	Total in 1353 days	Times per 100 days[1]	Total in 2018 days	Times per 100 days[1]	Total in 1907 days	Times per 100 days[1]	Total in 1016 days	Times per 100 days[1]	Total in 1097 days	Times per 100 days[1]
Fruit												
Citrus												
Orange	146	10.1	114	8.4	186	9.2	172	9.0	284	28.0	256	23.3
Lemon	64	4.4	36	2.7	165	8.2	326	17.1	6		13	1.2
Grapefruit	5		11		24	1.2	18		56	5.5	106	9.7
Tangerine	4		—		—		—		—		—	
Raw (not citrus)												
Apples	389	27.0	353	26.1	383	19.0	278	14.6	347	34.2	429	39.1
Bananas	71	4.9	62	4.6	108	5.4	177	9.3	80	7.9	123	11.2
Grapes	—		50	3.7	2		—		3		146	13.3
Strawberries	24	1.7	—		—		77	4.0	6		—	
Blackberries and dewberries	3		—		—		27	1.4	1		—	
Plums	1		—		—		1		—		—	
Persimmons	—		1		—		—		—		—	
Peaches	—		—		—		49	2.6	—		6	
Mulberries	—		—		—		14		—		—	
Figs	—		—		3		4		2		1	
Pears	—		—		—		—		—		17	1.5
Watermelon	—		—		—		—		—		1	
Cooked or dried												
Peaches	85	5.9	105	7.8	91	4.5	74	3.9	11	1.1	3	
Jam, jelly, and preserves	68	4.7	134	9.9	165	8.2	206	10.8	13	1.3	7	
Apples	92	6.4	92	6.8	58	2.9	97	5.1	24	2.4	27	2.5
Raisins	42	2.9	33	2.4	18		39	2.0	13	1.3	7	
Prunes	42	2.9	30	2.2	44	2.2	21	1.1	—		4	
Blackberries and dewberries	19	1.3	25	1.8	11		71	3.7	—		—	
Coconut	21	1.5	25	1.8	70	3.5	50	2.6	—		5	
Pineapple	15	1.0	19	1.4	28	1.4	13		7		10	
Pears	8		3		3		1		8		—	
Apricots	8		4		3		3		1		—	
Figs	1		2		47	2.3	27	1.4	3		4	
Fruit cake	1		6		2		—		—		—	
Plums	1		5		5		1		—		—	
Cherries	1		—		3		7		3		2	
Cranberries	—		3		—		—		—		—	
Strawberries	1		—		—		19		1		—	

each race in the three counties—Continued

Food	Negro Children								Mexican Children			
	Brazos County				Jefferson County				Hidalgo County			
	Number of times mentioned				Number of times mentioned				Number of times mentioned			
	In spring records		In winter records		In spring records		In winter records		In spring records		In winter records	
	Total in 1439 days	Times per 100 days[1]	Total in 1353 days	Times per 100 days[1]	Total in 2018 days	Times per 100 days[1]	Total in 1907 days	Times per 100 days[1]	Total in 1016 days	Times per 100 days[1]	Total in 1097 days	Times per 100 days[1]
Raspberries	1		—		—		1		1		—	
Grapejuice and punch	—		—		4		17		1		2	
Dates	—		—		—		—		1		5	
Vegetables												
Leafy												
Mustard greens, Turnip greens, Collards, Spinach, Rape, Greens (kind not stated)	219	15.2	352	26.0	233	11.5	188	9.9	—		6	
Cabbage and kraut	150	10.4	72	5.3	275	13.6	244	12.8	70	6.9	18	1.6
Lettuce	28	1.9	27	2.0	59	2.9	37	1.9	19	1.9	28	2.6
Celery	11		6		4		4		10		3	
Asparagus	—		—		1		4		2		—	
Cactus	—		—		—		—		14	1.4	1	
Potato or substitute												
Irish potato	240	16.7	278	20.5	378	18.7	453	23.8	329	32.4	401	36.6
Sweet potato	114	7.9	510	37.7	355	17.6	179	9.4	59	5.8	46	4.2
Sweet corn	69	4.8	49	3.6	124	6.1	155	8.1	14	1.4	9	
Others												
Dry beans	154	10.7	140	10.3	561	27.8	449	23.5	681	67.0	628	57.2
Peas, black-eyed and other field, English peas	128	8.9	74	5.5	152	7.5	163	8.5	21	2.1	34	3.1
Tomatoes	84	5.8	63	4.7	185	9.2	185	9.7	41	4.0	57	5.2
Onions	16	1.1	29	2.1	21	1.0	25	1.3	31	3.1	14	1.3
Vegetable soup	20	1.4	23	1.7	21	1.0	29	1.5	11		15	1.4
Carrots	10		10		9		10		11		1	
Pickle and relish	19	1.3	8		36	1.8	61	3.2	4		4	
String beans	15	1.0	6		5		117	6.1	6		1	
Turnips	11		6		13		7		3		—	
Beets	9		6		7		34	1.8	37	3.6	2	
Squash	5		—		—		3		—		2	
Pepper	2		8		1		1		3		1	

Table 8. Kinds of fruits, vegetables, whole cereals, protein foods (not milk), sweet foods, and beverages in the spring and winter diets of each race in the three counties—Continued

Food	Negro Children								Mexican Children			
	Brazos County				Jefferson County				Hidalgo County			
	Number of times mentioned				Number of times mentioned				Number of times mentioned			
	In spring records		In winter records		In spring records		In winter records		In spring records		In winter records	
	Total in 1439 days	Times per 100 days[1]	Total in 1353 days	Times per 100 days[1]	Total in 2018 days	Times per 100 days[1]	Total in 1907 days	Times per 100 days[1]	Total in 1016 days	Times per 100 days[1]	Total in 1097 days	Times per 100 days[1]
Radish	1		—		—		2		1		—	
Olive	2		1		1		—		—		2	
Okra	—		2		86	4.3	109	5.7	—		3	
Cucumber	1		—		—		1		—		—	
Pumpkin	1		1		—		—		1		29	2.6
Eggplant	—		—		1		—		—		4	
Cauliflower	—		—		1		—		—		—	
Whole cereal group												
Oats, rolled	281	19.5	172	12.7	274	13.6	112	5.9	30	3.0	70	6.4
Whole wheat (bread and crackers)	22	1.5	12		14		11		1		2	
Bran	10		16	1.2	4		4		—		1	
Popcorn	10		2		10		21	1.1	3		4	
Ralston	—		8		—		—		—		—	
Shredded wheat	4		6		7		2		—		—	
Grapenuts	6		2		3		1		—		3	
Puffed wheat	3		2		1		—		—		2	
Pep	—		1		—		—		—		—	
Tamales, enchiladas, and tortillas	—		—		3		—		1131	111.3	1116	101.7
Protein foods (not milk)												
Meat	1885	131.0	2153	159.1	3657	181.2	3305	173.3	1014	99.8	1180	107.6
Eggs	750	52.1	218	16.1	907	44.9	822	43.1	921	90.6	609	55.1
Legumes	272	18.9	200	14.8	703	34.8	596	31.3	710	69.9	670	61.1
Nuts	48	3.3	271	20.0	74	3.7	52	2.7	41	4.0	37	3.4
Cheese	54	3.8	63	4.7	98	4.9	87	4.6	101	9.9	79	7.2
Other foods												
Pastry	1029	71.5	911	67.3	1162	57.6	1270	66.6	297	29.2	273	24.9
Candy	547	38.0	456	33.7	644	31.9	567	29.7	495	48.7	424	38.7
Molasses and syrup	391	27.2	266	19.7	505	25.0	348	18.2	23	2.3	33	3.0
Cocoa	49	3.4	92	6.8	254	12.6	173	9.1	91	9.0	90	8.2
Tea	37	2.6	31	2.3	109	5.4	163	8.5	103	10.1	234	21.3
Coffee	29	2.0	30	2.2	171	8.5	165	8.7	970	95.5	942	85.9
Cocoa cola, etc.	21	1.5	21	1.6	197	9.8	75	3.9	44	4.3	95	8.7

[1]Values less than once in 100 days are omitted.

Average Number of Daily Servings of Some Foods and Classes of Food

The foods in each individual diet record were counted and grouped into the customary classes, based on general similarity of nutritive values. The

Table 9. Foods most frequently eaten

Food	Average number of servings per week		
	White	Negro	Mexican
Cereals (all kinds)	28.00	29.16	25.00
Pie, cake, etc.	5.00	4.67	1.89
Oats	1.67	0.88	—
Corn (whole meal)	—	—	7.45
Milk	15.91	9.09	12.50
Meat	8.14	11.48	7.00
Butter	5.38	3.18	3.04
Eggs	3.50	2.69	4.67
Vegetables			
Irish potatoes	3.50	1.40	2.41
Beans (dry)	1.63	1.37	4.38
Lettuce	1.04	—	—
Peas (all kinds)	0.86	—	—
Tomato	0.85	—	—
Sweet potatoes	0.74[1]	1.21	—
Cabbage and kraut	—	0.77	—
Greens	—	1.04	—
Fruits			
Apple	2.41	1.84	2.80
Jam, jelly, preserves	1.27	0.73[1]	—
Orange	1.21	0.67[2]	1.79
Banana	0.89	—	0.79[1]
Grapefruit	0.69[1]	—	0.68[1]
Lemon	—	0.78[1]	—
Grapes	—	—	0.93[1]
Sweets and beverages			
Candy	1.79	2.33	3.04
Syrup and molasses	1.25	1.52	—
Cocoa	1.08	—	—
Coffee	0.95	—	6.36

[1]winter only
[2]spring only

average number of times daily each class of food was eaten was calculated for each season in each county and for each race (Table 10).

Seasonal Differences: The striking similarity within each race in the averages for the two seasons is readily apparent (table 10, line of "average"). The only instances in which there was a dissimilarity for the average number of times the different foods were eaten in the two seasons occur in the case of the eggs and leafy vegetables, which are higher in spring diets and for citrus fruit, raw fruit, and nuts, which are higher in winter diets. These differences do not occur uniformly with all races and in all regions, however. The seasonal difference in the use of eggs

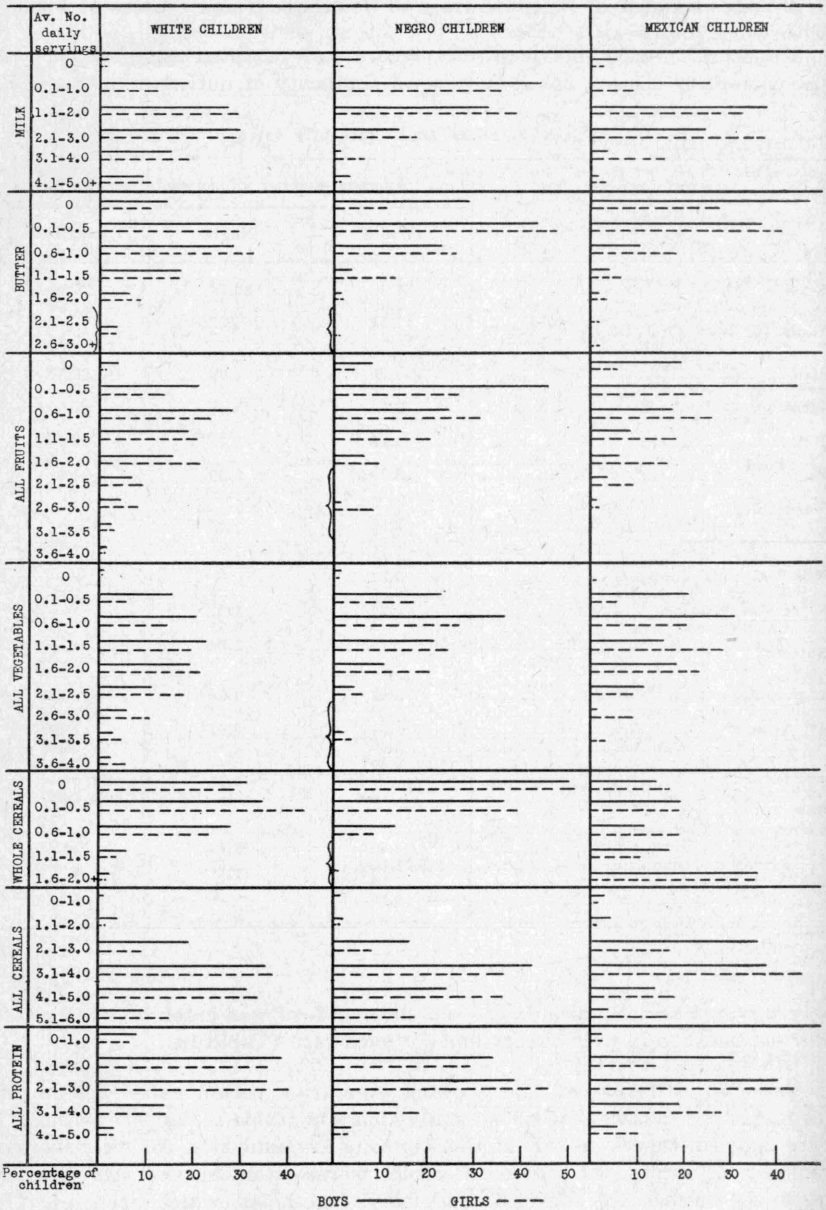


Fig. 1. Frequency distribution of number of daily servings of several food classes in the diets of individual boys and girls of the three races.

is greater among Mexican children than with the other two races. Among both white and negro children, eggs were eaten more often in the spring only in those counties (Brazos and Hidalgo) in which 1/3 to 1/2 of the group were farmers' children; presumably these children had access to a more abundant home supply of eggs in spring than in winter. In Jefferson county scarcely 1/20 of the group lived on farms. Only the Hidalgo county children both white and Mexican, and the white of Brazos county ate more leafy vegetables in spring than in winter. Of citrus fruit, a slightly higher consumption in winter was found only for the white children of Brazos and Hidalgo counties, and the Mexican group. The average frequency for the Brazos county white group and the Mexi-

Table 10. Diet with reference to region and season as shown by the average number of times daily some foods and several classes of foods appeared in the diets of the three race groups

Food	County[1]	Average number of times eaten daily by					
		White children		Negro children		Mexican children	
		Spring	Winter	Spring	Winter	Spring	Winter
Milk	B	2.47	2.28	1.35	1.16		
	J	2.19	2.15	1.43	1.25		
	H	2.33	2.42			1.93	1.67
	Average[2]	2.37	2.28	1.39	1.21	1.93	1.67
Butter	B	0.83	0.75	0.66	0.56		
	J	0.67	0.74	0.36	0.32		
	H	0.68	0.85			0.39	0.49
	Average[2]	0.76	0.77	0.49	0.42	0.39	0.49
All fruits	B	1.36	1.30	0.71	0.83		
	J	1.52	1.17	0.96	0.73		
	H	1.22	1.46			0.83	1.06
	Average[2]	1.34	1.30	0.85	0.77	0.83	1.06
Raw fruits	B	0.52	0.50	0.27	0.35		
	J	0.66	0.54	0.31	0.26		
	H	0.50	0.56			0.46	0.66
	Average[2]	0.53	0.52	0.29	0.30	0.46	0.66
Citrus fruit	B	0.24	0.31	0.15	0.12		
	J	0.25	0.22	0.27	0.19		
	H	0.34	0.43			0.27	0.34
	Average[2]	0.26	0.32	0.22	0.16	0.27	0.34
All vegetables	B	1.65	1.51	0.92	1.24		
	J	1.89	1.63	1.30	1.32		
	H	1.65	1.80			1.35	1.22
	Average[2]	1.71	1.60	1.14	1.29	1.35	1.22
Leafy vegetables	B	0.41	0.27	0.29	0.34		
	J	0.27	0.29	0.26	0.30		
	H	0.30	0.25			0.11	0.05
	Average[2]	0.35	0.27	0.27	0.31	0.11	0.05
All cereals	B	4.07	4.12	3.69	3.72		
	J	3.90	4.08	4.38	4.54		
	H	3.85	3.69			3.61	3.44
	Average[2]	3.97	4.01	4.09	4.20	3.61	3.44
Whole cereals	B	0.40	0.45	0.23	0.16		
	J	0.36	0.38	0.14	0.16		
	H	0.42	0.38			1.20	1.05
	Average[2]	0.40	0.42	0.18	0.16	1.20	1.05

[1]B=Brazos, J=Jefferson, H=Hidalgo
[2]Weighted average

Table 10. Diet with reference to region and season as shown by the average number of times daily some foods and several classes of foods appeared in the diets of the three race groups—Continued.

Food	County[1]	Average number of times eaten daily by					
		White children		Negro children		Mexican children	
		Spring	Winter	Spring	Winter	Spring	Winter
All protein (other than milk)	B	2.36	2.35	2.11	2.15		
	J	2.30	2.42	2.55	2.68		
	H	2.05	1.93			2.71	2.35
	Average[2]	2.27	2.27	2.36	2.46	2.71	2.35
Meat	B	1.16	1.45	1.33	1.57		
	J	1.18	1.26	1.72	1.82		
	H	1.01	1.17			0.98	1.08
	Average[2]	1.13	1.34	1.55	1.72	0.98	1.08
Eggs	B	0.75	0.46	0.53	0.18		
	J	0.57	0.60	0.45	0.45		
	H	0.61	0.33			0.89	0.57
	Average[2]	0.68	0.46	0.48	0.34	0.89	0.57
Cheese	B	0.09	0.06	0.04	0.05		
	J	0.09	0.08	0.04	0.05		
	H	0.10	0.09			0.10	0.07
	Average[2]	0.09	0.07	0.04	0.05	0.10	0.07
Legumes	B	0.32	0.30	0.20	0.15		
	J	0.42	0.23	0.32	0.35		
	H	0.28	0.30			0.71	0.60
	Average[2]	0.33	0.28	0.27	0.27	0.71	0.60
Nuts	B	0.06	0.10	0.03	0.20		
	J	0.06	0.095	0.02	0.04		
	H	0.06	0.087			0.04	0.03
	Average[2]	0.06	0.097	0.03	0.10	0.04	0.03
Sweets	B	2.39	2.22	1.78	1.68		
	J	2.19	2.09	2.02	1.92		
	H	2.21	2.24			1.19	1.11
	Average[2]	2.30	2.19	1.91	1.82	1.19	1.11
Coffee and tea	B	0.16	0.14	0.05	0.04		
	J	0.21	0.16	0.18	0.14		
	H	0.21	0.26			1.09	1.09
	Average[2]	0.18	0.17	0.12	0.10	1.09	1.09

[1]B=Brazos, J=Jefferson, H=Hidalgo
[2]Weighted average

cans in Hidalgo county was 2½ times in 10 days in spring, and 3 times in 10 days in winter; for the Hidalgo county white group, 3 times in 10 days in spring, and 4 times in winter. In both seasons there were some children in these counties who had no citrus fruit in the week during which records were kept, but there were fewer such cases in winter than spring. Jefferson county white children had an average of 2½ times in 10 days in both spring and winter. The abundant local supply of citrus fruit in Hidalgo county apparently had little influence upon its consumption by children there, since Brazos and Jefferson county children ate almost as much.

Nuts (including peanuts and peanut butter) were eaten nearly twice as frequently in winter as in spring by the white children in all three counties, and three times as frequently by the negroes; but scarely 1/4 of the white and 1/5 of the negro children had nuts in their diet.

Only the Mexican children had a higher frequency of raw fruit in winter than spring diets. This was due to greater use in winter of apples, bananas, and grapes.

Regional Differences: Aside from the differences noted above in the use of eggs and of citrus fruit in the three counties, the diets of the white children show no regional differences. The negroes of Brazos county had slightly more butter than those of Jefferson, and slightly less cereals, meat, sweets, and coffee and tea. The difference in the averages for coffee and tea is due to the fact that approximately three times as many of the Jefferson county as of the Brazos county group drank these beverages; the coffee and tea drinkers in the two counties had the same average frequency, 4 times in 10 days; the Jefferson county group had quite as good milk consumption as the Brazos county. All these small regional differences appear unimportant.

Since the few foods for which these small regional and seasonal differences were found had such a minor part in the diets of these groups of children, records from a sufficiently large group in either season appear to give equally satisfactory pictures of the qualitative character of the diet.

DIET WITH REFERENCE TO RACE

Racial differences in diet are, in general, small rather than large. White children had a little more milk, butter, fruits, and leafy vegetables than did either the negroes or Mexicans, and both white and negro children ate more sweet foods than did the Mexicans. The Mexicans exceeded both the white and negro children in the use of eggs, legumes, whole cereals, and coffee and tea. These differences are portrayed graphically in Figure 2, wherein the values for the spring diets as given in Table 10 are used. The most conspicious racial difference is the Mexican's greater use of coffee and tea; about three-fourths of this race drank these beverages while scarcely one-third of either white or negro children had coffee or tea in their diets. The question as to the influence of coffee and tea upon the milk of the diet is answered in part by the figures in Table 11. In 10 of 12 groups of children, those who did not drink coffee and tea had a higher average milk consumption than did coffee and tea users; the other two groups had the same average for milk. In all groups, however, of the children who did not drink coffee and tea fewer were found in the low-milk consumption group (2 cups or less) than among the children drinking coffee and tea. The use of coffee and tea therefore seems to have tended to crowd milk out of the diet. This replacement of milk by coffee and tea must not be as great among the Mexicans as with the other two races because nearly three times as many of the Mexicans as either of the other races drank coffee and tea, yet the average milk consumption for the Mexicans was greater than for the negroes and only a little less than for the white children.

In general, similarity rather than difference in kinds of foods used by the three races is the striking feature of this comparison. Methods employed by the Mexicans of preparing foods and combining them into meals

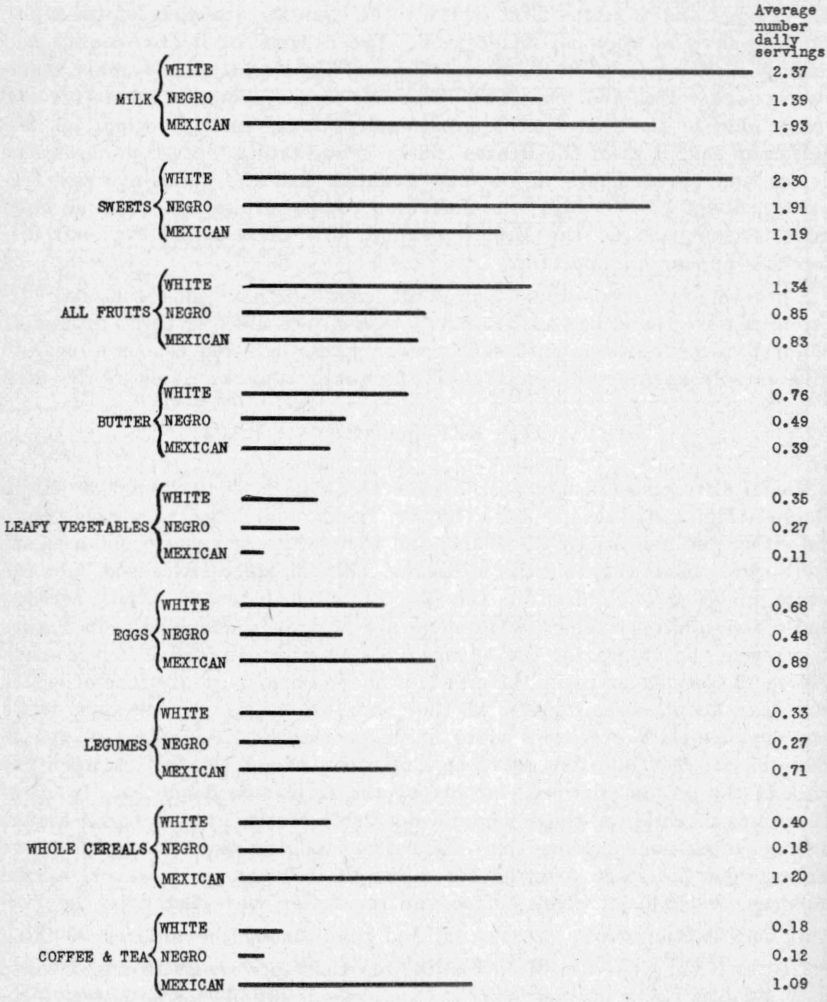


Fig. 2. Race differences in the use of some foods. Length of line is proportioned to the average number of daily servings.

differ to some extent from those employed by the whites and negroes, but from the standpoint of being qualitatively satisfactory the diets of the three races are fairly comparable.

Table 11. The relationship of the use of coffee and tea to the consumption of milk

Season	Coffee and tea	Milk in diet											
		White				Negro				Mexican			
		Boys		Girls		Boys		Girls		Boys		Girls	
		Average amount	Having 2 cups or less	Average amount	Having 2 cups or less	Average amount	Having 2 cups or less	Average amount	Having 2 cups or less	Average amount	Having 2 cups or less	Average amount	Having 2 cups or less
		Cups	%	Cups	%	Cups	%	Cups	%	Cups	%	Cups	%
Spring	Not used	2.4	43.2	2.6	37.5	1.4	77.4	1.5	74.1	1.6	58.8	2.7	24.0
	Used	2.1	51.2	2.2	52.6	1.0	91.4	1.4	80.0	1.6	72.9	2.0	54.7
Winter	Not used	2.5	42.3	2.5	39.8	1.2	87.6	1.3	78.4	2.1	50.0	2.7	29.4
	Used	1.7	66.4	1.8	62.8	0.8	94.0	1.3	79.2	1.3	81.8	1.7	63.3

Table 12. Diet with reference to occupational groups.

Percentage of group	Occupation of parents	Average number of daily servings																	
		Milk		Butter		Fruit		Vegetable		Whole cereal		All cereal		Protein (not milk)		Sweets		Coffee and tea	
		Spring	Winter	Spring	Winter	Spring	Winter	Spring	Winter	Spring	Winter	Spring	Winter	Spring	Winter	Spring	Winter	Spring	Winter
12	Professional	2.8	2.7	0.8	0.8	1.6	1.6	2.1	1.9	0.6	0.6	3.8	4.1	2.3	2.3	2.3	2.4	0.2	0.8
22	Business	2.3	2.3	0.7	0.9	1.3	1.3	1.8	1.7	0.4	0.4	4.0	3.9	2.2	2.3	2.3	2.2	0.2	0.2
30	Labor	2.1	2.2	0.7	0.8	1.3	1.2	1.7	1.7	0.4	0.4	3.9	4.1	2.3	2.3	2.3	2.3	0.2	0.2
36	Farmer	2.5	2.2	0.8	0.7	1.3	1.3	1.5	1.4	0.3	0.3	4.1	4.0	2.3	2.3	2.3	2.1	0.2	0.2

DIET WITH REFERENCE TO SEX

Dietary differences between the sexes are shown by the graphs in Figure 3. For the girls in each race, the average number of daily servings of milk, butter, fruits, vegetables, and protein foods was slightly but consistently higher than for boys. Whole cereals were equally infrequent

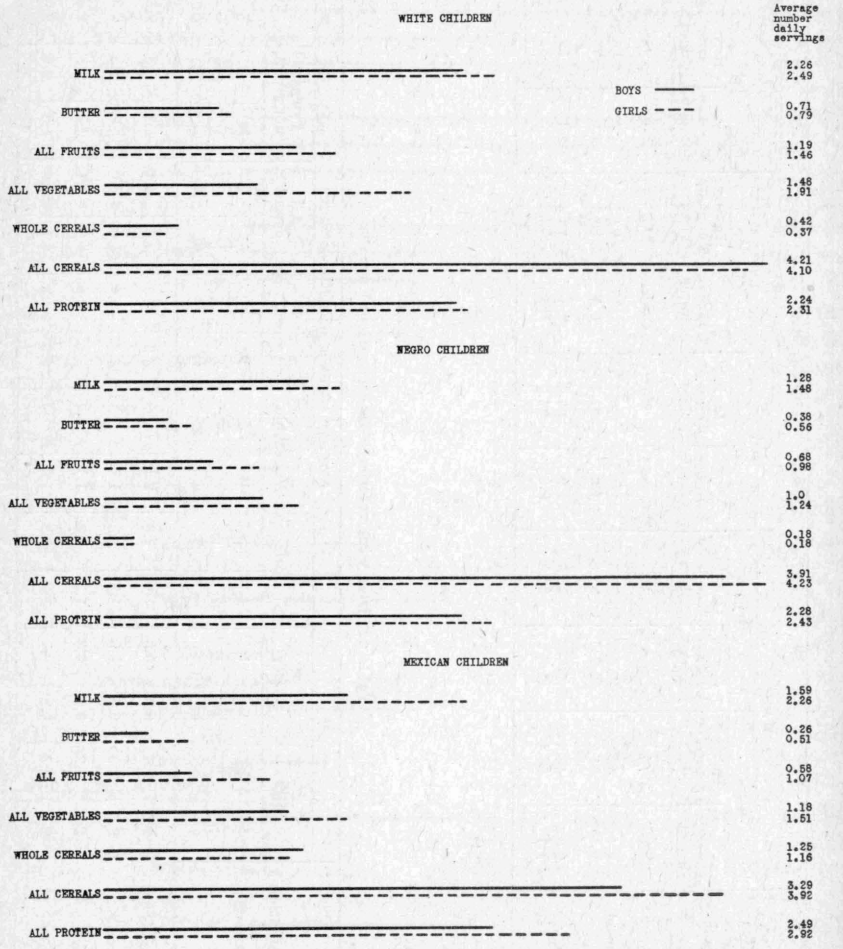


Fig. 3. Differences in the use of some classes of foods by boys and girls of the three races. Length of line is proportional to the average number of daily servings.

in the diets of negro boys and girls, but white and Mexican boys had a trifle higher average consumption of such foods. Whether the girls really had the better diets, or were more faithful in keeping their records, or more

successful in remembering what they ate, is an open question. However, while the differences are perfectly definite, they are small and make separate analysis of data for the two sexes unnecessary.

DIET WITH REFERENCE TO OCCUPATION

The group of white children was large enough and the four occupational groups were sufficiently represented to permit analysis of the diets with respect to the occupation of the children's parents. Table 12, p. 29, gives the average number of daily servings of the several classes of foods in the diets of the occupational groups and shows that the farmer, business, and labor groups had a definitely lower consumption of milk, fruits, vegetables, whole cereals, coffee and tea than the professional group had. In the case of milk, fruits, and vegetables this is rather a surprising finding for the farmer children since this group is at the source of supply and production of these foods holds an important place in the industry of each county. Evidently some other factor has a greater influence upon the type of diet children eat than does the mere availability of food. Education in eating habits and cultivation of a liking for milk, fruits, vegetables, and whole cereals would probably go far toward actually getting these valuable foods into the diets of growing children.

EVALUATION OF THE DIET AS A WHOLE

An appropriate diet for children must provide materials for body growth and activity, and in so far as possible maintain health. As summarized by Sherman (9) the essentials are: "(1st) sufficient of the organic nutrients in digestible forms to yield the needed energy; (2nd) protein, sufficient in amount and appropriate in kind; (3rd) adequate amounts and proper proportions of the various ash constituents or inorganic foodstuffs; (4th) sufficient of each of the essential vitamins". In practical experience, however, not isolated nutrients such as protein, calcium, iodine, fat, vitamin A or C, etc. are eaten, but combinations of two or more nutrients in bread, milk, lettuce, oranges, meat, and other ordinary foods. While it is possible to derive adequate amounts of the necessary nutrients from a very few properly selected foods, it has become customary in planning children's diets to specify the inclusion of at least minimum amounts of those classes of food which best insure the dietary essentials that are likely to be lacking—minerals, vitamins, protein of high nutritive value, and bulk. Hence fruits, vegetables, whole cereals, milk and other animal protein foods hold a prominent place in well-planned dietaries. Thus safe-guarding the qualitative character of the diet is regarded the most practical way of providing for optimum nutrition.

Considering the diet from a quantitative viewpoint, the tentative and hypothetical nature of the quantitative standards for children beyond the age of infancy is their most conspicuous feature, and is well recognized. All agree that revision of the standards may follow when a larger fund of

Table 13. Estimated nutritive value of an average diet composed of the foods of each class most commonly eaten by the children in this study

White children

Food	Amount	Calories	Protein	Calcium	Phosphorus	Iron	Vitamins							
							Approximate Value						Units	
							A	B	C	D	E	G	A	C
			gm	gm	gm	gm								
Milk	2.3 cups	391	18.6	0.680	0.524	.00113	+++	++	?	+	+	+++	1214	20
Butter	¾ tablespoon	75					+++			++	+		525	
Banana	½ medium	50	0.7	0.005	0.016	.00031	+++	+	+				180	10
Orange	¼ large	25	0.4	0.022	0.010	.00025	++	++	+++				35	26
Apple	1 medium	75	0.5	0.009	0.015	.00045	+	+	+			++	64	11
Lettuce	1 oz.—2 leaves	5	0.3	0.012	0.012	.00020	+	++	+++		++	++	46	2
Potato	1 medium	100	3.0	0.016	0.070	.00110	+	+	+			++	40	15
Beans, kidney	1/3 cup cooked	100	5.8	0.040	0.143	.00230	+	+++					40	
Rolled oats	¼ to ½ cup cooked	50	2.2	0.009	0.050	.00050		+					?	
Bread (white)	7 slices	350	12.6	0.039	0.126	.00123							15	
Meat	2 pieces	200	27.3	0.002	0.294	.00308		+				++	20	
Egg	½ medium	35	3.0	0.015	0.041	.00068	+++	+		++		+++	462	
Sugar	5 tablespoons	250												
Salad dressing / Cooking fat	3 tablespoons	300												
	Totals	2006	74.4	0.849	1.301	.01123							2641	84
Negro children[1]														
	Totals	1767	65.4	0.529	1.059	.01038							1873	46
Mexican children[2]														
	Totals	2106	77.9	0.715	1.253	.01166							2832	79
Tentative standards for children 6-17 years		1500 to 3000	gm 60-90	gm 1.0	gm 1.0 to 1.32	gm .0075 to .015	Units required not yet determined. Liberal provision of vitamin-rich foods advised.							

reliable information is available. The definite amounts that have been proposed refer to energy, protein, calcium, phosphorus, and iron. Among standards recently suggested, those of Sherman and Gillett (9), Rose (8), Hawley (5), and Wait and Roberts (12) (13) (14) are in fair agreement. In general, the recommendations of these authorities are embodied in the tentative standards shown in Table 13.

Estimated Nutritive Value of an Average Diet

An indication of the nutritive value of the average diet of Texas school children is shown in Table 13. The foods listed in this illustrative diet are those in each food class which were most commonly eaten by the white children in this study, and the amounts given are based upon the average number of times daily each food class was recorded. It was assumed that the individual servings were of ordinary size, and the several foods of average composition. The calculations for calories, protein, calcium, and phosphorus are based on figures for average composition as given by Sherman (9). For iron, the more recent figures reported by Stiebeling (10) and by Peterson and Elvehjem (6) were used. The comparative vitamin values are taken from the compilation by Smith (11).

This diet would furnish sufficient energy for a child 6 to 11 years old, and also enough protein, phosphorus, iron, vitamins B and G, and probably enough vitamin C. But it would provide only 85 per cent of the amount of calcium called for by the standard and about one-half as much vitamin A as has been suggested by Gillett and Rice (4). The calcium shortage would be entirely covered by another cup of milk, and this extra milk, along with 1 more tablespoon of butter and a whole egg rather than one-half, would probably sufficiently increase the vitamin A.

Very little change in the diet for the white children (Table 13) is necessary to make it fit the averages of the negro and Mexican children. The only changes required for negro children are the subtraction of 1 cup of milk and a slight reduction in the butter and fruit. For the Mexicans ½ cup of milk should be subtracted, a 50-calorie portion of oats should be replaced by a 100-calorie portion of whole corn, and ½ egg added. This average diet for negro children apparently provides only half as much calcium as a growing child needs according to the standard, and the phosphorus and iron content would be less than is regarded as satisfactory. The Mexican child would fare better than the the negro in phosphorus and iron supplied, but the calcium is scarcely ¾ of the standard allowance.

It should be pointed out, however, that many children had a poorer diet than that given in Table 13. Seventeen per cent of the white children had only 1 cup of milk or less, 1/4 of them had no raw fruit, 1/3 to 1/2 no citrus fruit, and 1/3 of them no leafy vegetables; over 1/4 and 1/3 of negro and Mexican groups, respectively, had 1 cup of milk of less; similar proportions of negro and Mexican as of the white children lacked citrus and raw fruits and leafy vegetables, and in addition 1/5 of these two races had no butter in their diets. Lack of these foods would greatly

Table 14. Score cards: (per day basis) used by three states in contemporaneous dietary studies

Texas*				Massachusetts†				South Carolina‡			
Food	Amount	Value		Food	Amount	Value		Food	Amount	Value	
Milk (any kind)	1½ pints	24		Milk	1 quart[2]	24		Milk	1 quart	24	
Butter	at least once	6		——				——			
Fruit (raw, cooked, dried)	2 or more serv.	10		Fruit				Fruit			
raw (not citrus)	at least 1 serv.	5	20	raw (or raw veg. or canned tomato)	twice a day	14	21	raw (or raw veg. or canned tomato)	twice a day	14	19
citrus or tomato	4 times per week	5			once a day	7		cooked	once a day	5	
Vegetables				Vegetables				Vegetables			
leafy	at least 1 serv.	5		leafy	4 times a week	8		if leafy veg.	4 times a week	6	
potato or substitute[1]	1 or more serv.	15	20	potato	once a day	5		potato (white or sweet)	once a day	7	23
others	1 or more serv.			other than potato or leafy	once a day	10	23	other than potato	twice a day	10	
Cereals				Bread and cereals				Bread and cereals			
whole	1 or more serv	10	15	whole grain	twice a day	14		whole grain	twice a day	14	
refined	1 or more serv.	5									
Protein-rich											
meat or eggs or legumes or nuts	1 serv. of any 1	10	15	Meat	once a day	9	18	Meat	once a day	8	20
	1 serv. of any additional one	5		Eggs	3 times a week	9		Eggs	4 times a week[3]	12	
	Total	100			Total	100			Total	100	
	No deductions			Coffee or tea	Deduct	10			No deductions		
				Deduction was made for the use of meat more than once per day and 10 points were subtracted for regular use of tea or coffee.							

[1]Sweet potato, parsnip, sweet corn.
*Devised for use in this study

[2]In case the child had only 1 pint of milk per day and meat once a day, extra value of 3 points was given for each egg up to 7 per week.
†Bulletin No. 241, Mass. A.E.S.

[3]Allowance was made for additional eggs when meat was used less than once a day, or where there was less than a pint of milk daily, if in the same diet green leafy vegetables were present in liberal amounts.
‡Bulletin No. 268, South Carolina, A.E.S.

reduce the vitamin A, B, and C content of the diet and the minerals, especially calcium and iron. Nearly 1/3 of the white children, 1/2 of the negroes, and 15 per cent of the Mexicans had no whole cereal; unless those vegetables and fruits which are good sources of phosphorus and iron were then included in the diet, these essentials were likely lacking.

Development and Use of the Diet Score Card

As a means of reducing the diet records to one common term for purpose of comparing the diets as a whole, a score card was devised. (Table 14, Texas). In developing the score, the recognized nutritive values of the several classes of food were kept in mind and an attempt made to assign appropriate numerical values. These score values represent personal judgments which may or may not rightly express relative nutritional values. The score is purely an arbitrary device; but despite its inherent limitations it serves as a means for comparing the diet records. It is resorted to only because the more desirable and exact evaluation by calculation of the nutrients supplied in the individual diets cannot be employed with the qualitative records of this study.

Milk, generally regarded as the most valuable single food, was given the highest score value. Milk is a source of proteins of high biological value, of abundant calcium and phosphorus in favorable ratio, and of easily assimilated iron; it is rich in vitamins A and G and is a fair source of B, D, and E. Both milk as such and foods containing milk were given credit in scoring. Butter, an easily digested fat rich in vitamin A, called for a separate evaluation because a conspicious amount of the milk consumed in Texas is in the form of skim milk, clabbered milk, or buttermilk.

Fruits and vegetables, which contribute vitamins, cellulose, and minerals to the diet, were given the same score values, only a little less than milk. Citrus fruits and tomatoes, and raw fruits were given credit separately as well as being counted with "fruit, any kind". Citrus fruit and tomatoes are the best of the known sources of vitamin C; they are also good for vitamin B. Oranges and tomatoes are further valuable for vitamin A, and they make a significant contribution to the calcium and iron of the diet. Raw fruits in general afford greater assurance of an abundant supply of vitamin C and B and a sufficient amount of cellulose. Leafy vegetables, assigned a separate score value, are comparable with butter as a source of vitamin A; they are valuable also for vitamins C and B and exceedingly important sources of both calcium and iron. "Potato or substitute" and "other vegetables", while listed separately, were scored jointly.

The primary value of both refined and whole-grain cereals is energy, but the whole-grain products are superior to the refined in the quality of their proteins, and their content of phosphorus, iron, and vitamins B and E. Bran was counted as whole cereal in scoring. As two different protein foods other than milk were required to receive the full protein score both the protein and the other nutrients supplied by these foods are recognized: for example, iron from meat; iron and vitamins A and D from eggs;

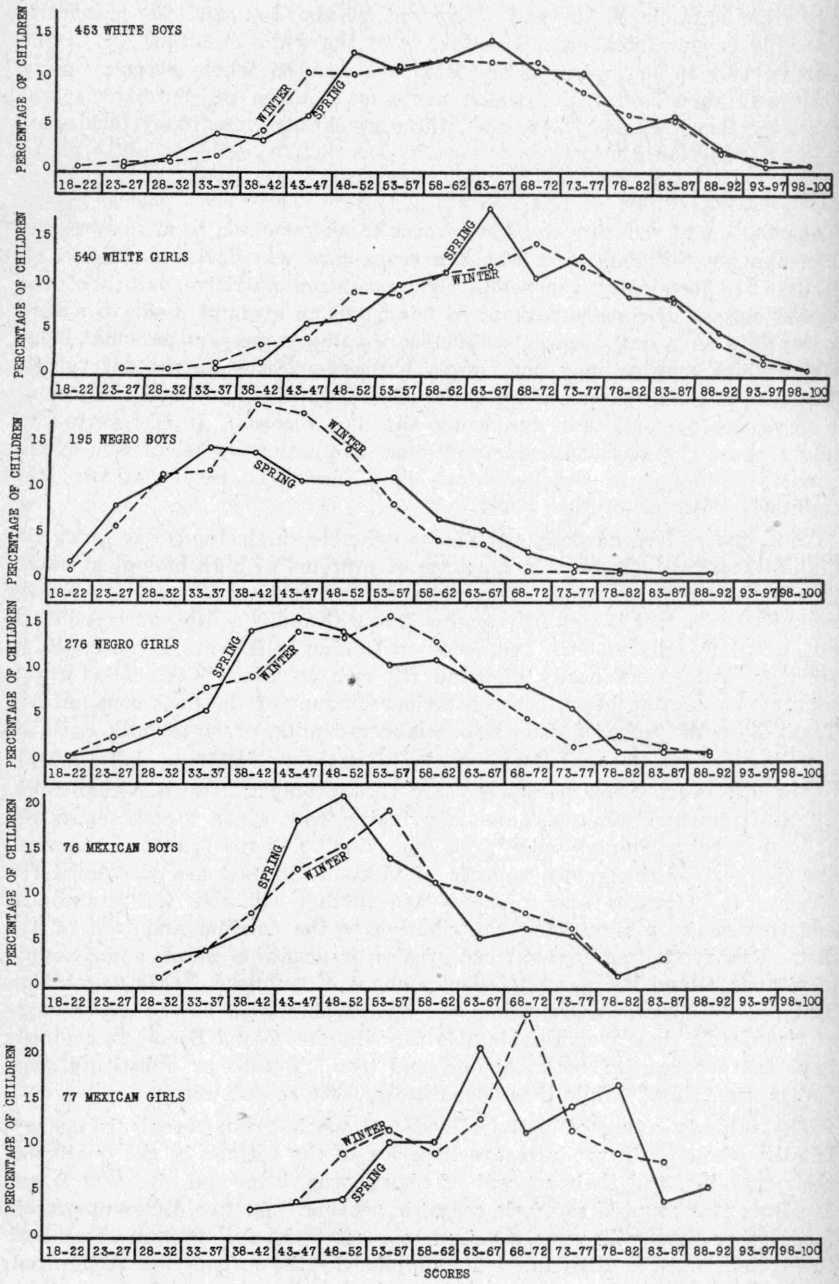


Fig. 4. Distribution of diet scores for boys and girls of each race and for two seasons.

calcium from cheddar cheese; calcium, iron, and vitamin B from legumes; and vitamin B from nuts.

No deductions were made for the use of any food with respect either to kind or amount.

Diet Scores with Reference to Season, Sex, and Race

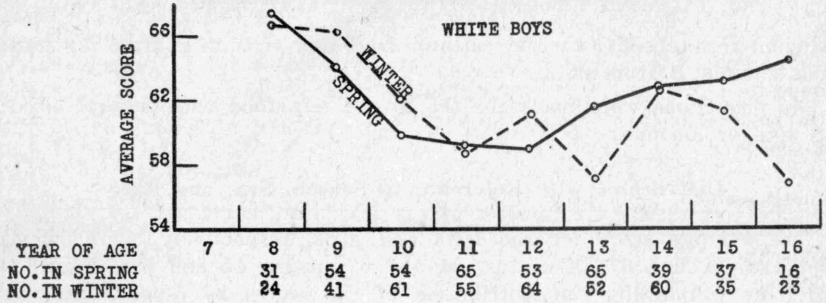
The average score for the boys and girls, respectively, were: white children, 62 and 67; Mexicans, 54 and 67; negro 44 and 52. Figure 4 presents graphically the distribution of the scores by 5-point intervals for the two seasons for each sex in each race. These graphs show at once (1) the striking similarity in the different seasons between the qualities of the diets as measured by the score, (2) the slight superiority of the girls' diet to that of the boys in each race, and (3) that racial differences while present are less pronounced than is sometimes supposed.

Diet Scores with Reference to Age

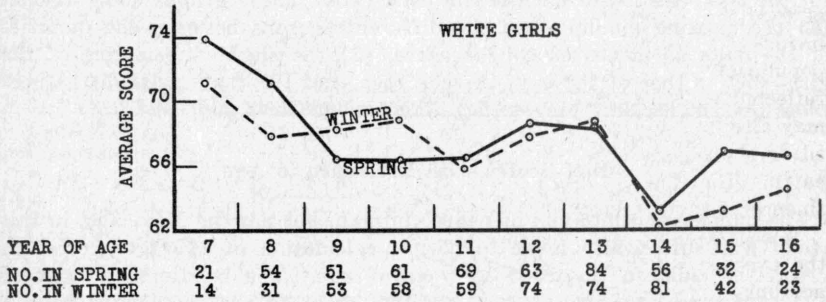
The number of white and of negro children, but not the Mexicans, in this study was sufficiently large to permit calculation of average scores for groups of children classified by year of age. The relationship between diet score and age, different for the two races, is presented by Figure 5. The sequence of ages includes only those ages in which the number of individuals seemed to make their use permissible. Each child appears at 2 points on each graph, once in spring and once in winter. In a few cases a child had the same age for both spring and winter, but for the most part they moved from one age in spring to the next higher age in winter, or the reverse, according to the seasonal sequence of collecing the diet records. Never is the same child found at two different ages in the same season. Thus each curve represents the findings for two different groups of children in each sex in the span of the years included. The irregularities of any one of the graphs considered independently are to be accounted for in part by the effects of random sampling.

The graphs for the white boys and girls in general resemble each other. In both cases the lines trend downward from 7 or 8, to 10 or 11 years; at a later age there is a rise, and in 3 of 4 graphs a subsequent fall. For boys the rise begins at 13 years and the subsequent fall at 14 years. With the girls the rise starts at 11 years, and the later fall occurs between 13 and 14 years. Although the differences found between the ages in this analysis are not pronounced they are perfectly definite, and because of the similarity of the two sets of graphs and the consistent relationship of average diet score to age within each sex group, it is likely that some other factor than chance is operating.

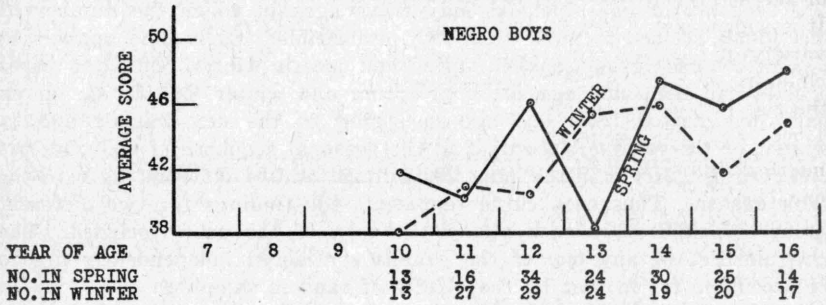
A possible explanation of the fall in the fore part of the graphs may be a closer supervision by parents of the diets of the younger children along with the less pronounced preferences and prejudices on the part of the children themselves at the earlier ages.



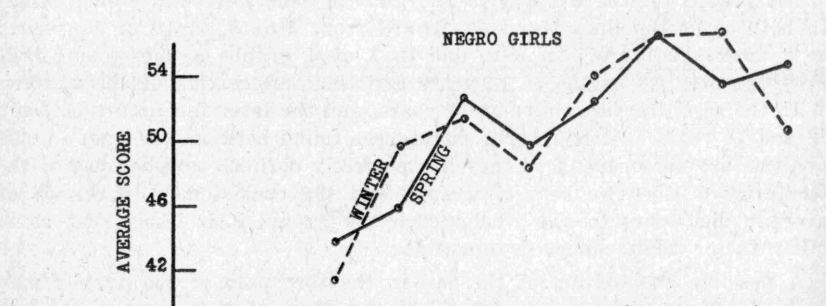
YEAR OF AGE	7	8	9	10	11	12	13	14	15	16
NO. IN SPRING		31	54	54	65	53	65	39	37	16
NO. IN WINTER		24	41	61	55	64	52	60	35	23



YEAR OF AGE	7	8	9	10	11	12	13	14	15	16
NO. IN SPRING	21	54	51	61	69	63	84	56	32	24
NO. IN WINTER	14	31	53	58	59	74	74	81	42	23



YEAR OF AGE	7	8	9	10	11	12	13	14	15	16
NO. IN SPRING				13	16	34	24	30	25	14
NO. IN WINTER				13	27	29	24	19	20	17



YEAR OF AGE	7	8	9	10	11	12	13	14	15	16
NO. IN SPRING			6	25	32	27	31	48	33	29
NO. IN WINTER			21	18	23	39	47	33	28	24

Fig. 5. Diet score with reference to age.

The trend of the graphs for the boys between 13 and 14 years is in the opposite direction from those for the girls at the same ages; 14 years on the boys' graph is a high point, on the girls', a low point. The rise in the graph begins at an earlier age (11 years) for the girls than for the boys (13 years), and the subsequent fall is one year earlier for the girls than for the boys. Although the diet scores in this study are based on qualitative records, the coincidence of the rise in the graph with the onset of puberty in each sex and the subsequent fall corresponding to the age of decline in the rate of growth attract attention. Perhaps the increased desire for food during early adolescence may influence not only the amount of food the child consumes but the variety, so that his diet is more apt to include the several classes of food. It is possible that the prevailing popularity of slenderness among girls and the fad for dieting may be reflected in a restriction of foods eaten by them at age 14 and after. It may also be that a liking for the various food classes has not been developed or their importance appreciated to the point that assures their being eaten. The drop after 13 years for the girls may also reflect the influence of the decrease in rate of growth upon eating habits.

With the negro children, the general trend of the 4 graphs is upward, the average score increasing in value with age. If parental supervision accounts for the higher scores of the white children of 7, 8, and 9 years of age, it must be that effective supervision for negro children was lacking. It is suggested that either the gradual cultivation of a liking for a greater variety of foods or the possible greater availability of food to older negro children (though in what way is not indicated in this study), explains the rise of the diet score with age among the negroes.

The difference between higher and lower scores for both white and negro children has been found to be due to the greater use of more than one class of food. The white children of 7 and 8 years, and boys of 14 and girls of 13 years (the ages of higher scores) had in general a more liberal amount of milk, fruit, vegetables, and whole cereal than did the boys of 12 years and girls of 11 years. Negroes of 15 and 16 years (the ages of higher scores) used milk, fruits, and butter more frequently than did the group of 9-, 10-, and 11-year-olds.

Both the results of scoring the diet as a whole, and the average daily frequency of the several classes and the more prominent individual foods in the diet, indicate that some other unknown factor or factors are more influential in determining the kinds of food a child eats than are racial habits, season of the year, or the supply of locally-produced foods. The shortcomings of the diet of the race and sex groups in this study differ only in degree, and not in kinds of foods used. On the whole as compared with the standard well-balanced, varied diet, there is probably a sufficient supply of protein-rich foods other than milk, a relative over-abundance of refined cereal preparations, and a deficiency of milk, fruits, vegetables, whole cereals, and possibly of butter. The findings furnish support of the desirability of continued emphasis upon the liberal use of milk, fruits, vegetables, and whole cereals. The indication in this study of multiple

rather than single deficiency in the use of foods suggests the necessity of securing definite information concerning both quantity and kind of food in the diet before steps are taken to improve the diet of individuals or groups.

COMPARISON WITH CONTEMPORANEOUS STUDIES

The findings for the white children of this study lend themselves to interesting comparison with those of contemporaneous dietary studies of public school children in four other states, Virginia (7), Massachusetts (2), Florida (1), and South Carolina (3).

The ages of the Virginia children ranged from 5 to 14 years, inclusive; of those in Massachusetts from 6 to 17 years; in Florida from 6 to 19 years; in South Carolina the group included 8-, 9-, and 10-year-olds. Reynolds in Virginia had the children answer questionnaires as to the amount of milk consummed daily and the frequency with which fruits and vegetables were eaten. Davies secured her information in a dairying and a non-dairying community in Massachusetts, from a record of one day's meals as given by a child, together with answers to questions put to him and to his mother regarding his eating habits. Ahmann, Abbott, and Westover secured a two-day record of the diet eaten by children in "five representative counties of Florida"; four seasons of the year were included but all records were pooled for analysis. Frayser and Moser based their study on two-day diet records collected from "one county representative of rural South Carolina".

The score cards devised for use in Texas, Massachusetts, and South Carolina are quite similar, as may be seen by the values assigned to the several food classes in Table 14.

In Figure 6 the distribution of the scores on the basis of five-point intervals is shown for 993 children of Texas, 322 in South Carolina, and 275 in Massachusetts. The spring scores of the Texas group are used.

The distributions for Texas and South Carolina are strikingly similar, while the Massachusetts diets in general scored lower than those of the two southern states. The differences in the graphs for the three states are probably due in large part to the deductions which were made in the Massachusetts records for the regular use of tea and coffee, and for the use of meat in amount considered excessive, while no deductions were made in Texas and South Carolina.

The Florida workers, using a score card varying somewhat from the others cited in numerical values assigned to food classes, found but 1 per cent of the diet records with scores of 80-100 points, their "commendable" class, and 24 per cent of 60-80, their "adequate" class. Reynolds divided the Virginia records into five classes designated by letters A, B, C, D, and E, in accordance with the nearness of the eating habits to current standards for milk, fruits, and vegetables. A and B diets were regarded good, C questionable, D and E poor or bad. The three classes of the grades include, respectively, 18, 72, and 10 per cent of all the records. In the

Texas study about 12 per cent of the records scored 83 points and over. The Florida, Virginia, and Texas studies are therefore in agreement in that a relatively small percentage of the diets had high scores.

The similarity of the dietary habits of the school children in the several states is well brought out by comparison of scores on classes of food.

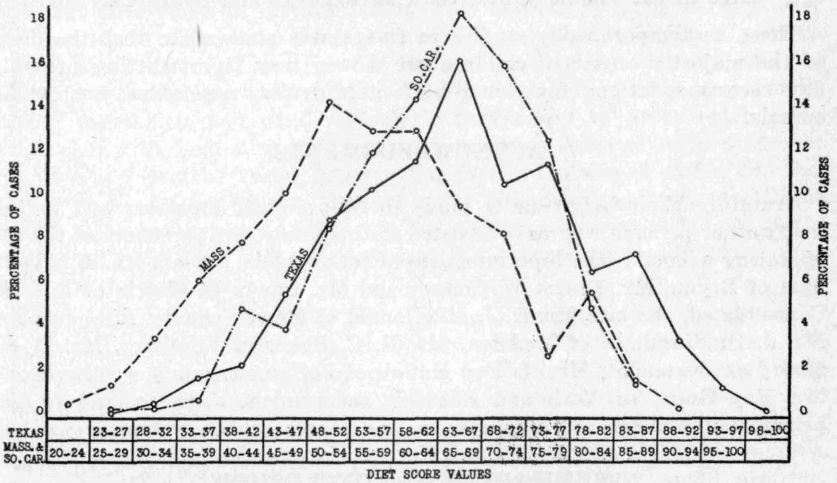


Fig. 6. Comparison of total-diet scores of white school children in three states.

The Virginia study concerned itself with the milk, fruit, and vegetables in the diet and found consumption of them markedly below standards.

The dairying community of Massachusetts had 64 per cent of the milk scores in the highest interval of value (20-24 points); the non-dairying, 16 per cent. Only 28 per cent of the Texas milk scores were in the highest interval. Since the Massachussetts study demanded four cups of milk, and Texas three cups for full score, the dairying community of Massachusetts definitely excelled the Texas children in the use of milk. South Carolina, like Massachusetts, required four cups of milk for a full score. The upper score interval in South Carolina includes about the same percentage as in Texas, but, because of the difference in scoring basis the consumption of milk in South Carolina is probably somewhat higher than in Texas.

Of fruits and vegetables there was a limited consumption alike in Texas, Massachusetts, and South Carolina, but the latter two states have a relatively greater percentage of these scores in middle values while Texas scores are more evenly distributed throughout the range. Texas and Florida studies agree in that meat and refined cereals are the most frequently recorded foods while fruits and leafy vegetables appear with comparative infrequency.

As for whole cereals, Massachusetts and Texas are alike in having about one-half of their records with scores of zero and in the lowest third of the

score values. South Carolina has fewer low scores than either Massachusetts or Texas.

The meat and egg scores of South Carolina and the protein-rich foods of Texas are comparable, the bulk of the scores in both states being in the highest interval. Massachusetts records have relativedy more meat and egg scores in the middle values than have Texas and South Carolina.

These contemporaneous studies in five states show alike that the diets of the majority of school children are a long way from meeting present-day recommendations for the use of milk, fruits, vegetables, and whole cereals.

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SUMMARY AND CONCLUSIONS

Written records of all food eaten for a week in spring and also in winter were secured from 993 white children in Brazos, Hidalgo, and Jefferson counties, 471 negroes in Brazos and Jefferson counties, and 153 Mexicans in Hidalgo county. These records are the basis for this report upon the regional, seasonal, and racial aspects of the diet of Texas school children.

Despite a distinct diversity in the agriculture and hence the supply of certain locally-produced foods in the three regions, only minor differences appeared in the diet of the children in the three counties. For example, children in Hidalgo county had but slightly higher consumption of citrus fruit than did those in Brazos or Jefferson county; figs while grown much less extensively in Brazos than Jefferson county were as frequently eaten by the Brazos county group; leafy vegetables (cabbage and the various kinds of greens), were eaten with about equal frequency in the three counties. The chief regional differences, and these not pronounced ones, were (1) the greater use of eggs in the spring by the children in Brazos and Hidalgo counties, where larger proportions of the group were farmers' children than in Jefferson county; (2) the use of coffee and tea by a greater number of the Jefferson county negroes than by those in Brazos county.

Seasonal differences were inconspicious. Eggs and leafy vegetables were eaten somewhat more often in the spring than in the winter, and citrus fruit, raw fruit, and nuts slightly more often in winter. The foods in

which seasonal differences in consumption appeared, had a minor part in the diets as a whole with the one exception of eggs in the diet of the Mexicans. Hence seasonal differences were unimportant.

Records of the two seasons in any of the three regions give quite similar pictures of the qualitative character of the diet.

Racial differences in dietary habits with respect to kinds of food used are much less conspicuous than is commonly supposed. While in general, the white children had a somewhat better diet than the Mexican, and the Mexican than the negro, all appear to have a deficiency in the use of milk, fruits, vegetables, and whole cereals, a sufficiency of protein-rich foods other than milk, and a relative over-abundance of foods of refined cereals. The most noteworthy racial difference occurs in the use of coffee and tea; three times as many of the Mexican as of either white or negro children drank these beverages. Coffee and tea tended to crowd milk out of the diet in all races, but still the Mexicans had better records for using milk than did the negroes.

Estimation of the nutritive value of an illustrative diet composed of the foods in each class most commonly eaten by the children of this study, and used in amounts corresponding to the average frequency of these foods in the diets, indicates that the diet of white and Mexican school children is apt to be deficient in calcium and possibly vitamin A; of negroes in calcium, vitamin A, and probably also in vitamin C, phosphorus, and iron. The calories supplied by the illustrative diet would probably be sufficient only for children 6 to 11 years of age.

The girls of each race had slightly better diets than the boys, the difference being due to their more liberal use of milk, butter, fruits, and vegetables.

Children of the farmer, business, and labor groups had a definitely lower consumption of milk, fruits, vegetables, whole cereals, and coffee and tea than the professional group had. This is surprising in the case of the farmers, since milk, fruits, and vegetables can be produced at home in the counties of this study.

White children of 8 and 9 years, the girls of 13, and boys of 14 had better diets than those of 10, 11, and 12 years. It is suggested that this may be due to more parental supervision of the diet in early years, and the influence of a more hearty appetite in the years of rapid growth. Among negro children the diet improved with age. Perhaps this reflects lack of negro parental supervision in early years and cultivation of a liking for a greater variety of foods as the child grows.

Evaluation of the diets by means of a score card shows, as do also the average daily frequencies of the several classes of food in the diets, that (1) the collective diets of the two seasons were practically identical, (2) that the white children had somewhat better diets than the Mexican and the Mexican than the negro, and (3) that the girls in each race had slightly better diets than the boys. Comparison of the diet scores of white children in this study with those of contemporaneous similar sur-

veys in four other states disclosed similar dietary deficiencies—viz., milk, fruit, vegetables, and whole cereals.

The findings of this study indicate that some other factor (or factors) than racial habits, season of the year, or differences in the supply of locally-produced foods exercises a greater influence in determining what kinds of foods school children eat. The findings further suggest that there are good reasons for continued emphasis upon the liberal use of milk, fruits, vegetables, and whole cereals in the diet of growing children.

LITERATURE CITED

1. Ahmann, Chester F., Abbott, Ouida Davis, and Westover, Georgia. 1930. A nutritional study of the white school children in five representative counties of Florida. Fla. Agr. Exp. Sta., Bul. 216.
2. Davies, Esther S. 1928. The food consumption of rural school children in relation to their health. Mass. Agr. Exp. Sta., Bul. 241.
3. Frayser, Mary E. and Moser, Ada M. 1930. The diet of school children in relation to their health. S. Car. Agr. Exp. Bul. 268.
4. Gillett, Lucy and Rice, Penelope B. 1931. Influence of education on the food habits of some New York City families. New York Assn. for the Improvement of the Condition of the Poor, New York City.
5. Hawley, Edith. 1927. Dietary scales and standards for measuring a family's nutritive needs. U.S.D.A. Tech. Bul. 8.
6. Peterson, W. H. and Elvehjem, C. A. 1928. The iron content of plant and animal foods. J. Biol. Chem., 78:215.
7. Reynolds, Ellen A. 1926. The relation between dietary habits and health of children in rural sections of Virginia. Va. Agr. Exp. Sta., Bul. 250.
8. Rose, Mary S. 1927. The foundations of nutrition. The Macmillan Co.
9. Sherman, H. C. 1932. The chemistry of food and nutrition. Fourth Edition. The Macmillan Co.
10. Stiebeling, Hazel K. 1932. The iron content of vegetables and fruits. U.S.D.A., Cir. 205.
11. Smith, Sybil L. 1929. Vitamins in food materials. U.S.D.A., Cir. 84.
12. Wait, Bernice and Roberts, Lydia J. 1932. Studies in the food requirement of adolescent girls: I. The energy intake of well-nourished girls 10 to 16 years of age. J. Am. Diet. Assn., 8:29.
13. Wait, Bernice and Roberts, Lydia J. 1933. Studies in the food requirement of adolescent girls: III. The protein intake of well-nourished girls 10 to 16 years of age. J. Am. Diet. Assn., 8:403.
14. Wait, Bernice and Roberts, Lydia J. 1933. Studies in the food requirements of adolescent girls: IV. The mineral intake of 38 well-nourished girls 10 to 16 years of age. J. Am. Diet. Assn., 9:124.
15. Whitacre, Jessie and Terril, E. D. 1931. Growth in height and weight of Texas school children. Progress report. Tex. Agr. Exp. Sta., 44th annual report: 92.